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(54) Sliding fence for a compound mitre saw

(57) A fence assembly (16,52) is provided for a compound miter saw (10,50) having a blade (24,62) which is tiltable relative to a planar work surface. A first fence portion (34,54) is affixable to the saw (10,50) on one side of the saw blade (24,62). A second fence portion (36,56) is affixable to the saw (10,50) on the opposite side of the saw blade (24,62) toward which the blade (24,62) is tiltably adjusted. The second fence (36,56) is made up of a fixed portion (38,58) mounted to the table surface and a second fence portion (40,60) mounted to the fixed portion (38,58) and transversely adjustable toward and away from the saw blade (24,62), enabling the workpiece to be supported adjacent the saw blade (24,62) when the blade (24,62) is in the vertical orientation, yet allowing the adjustable fence portion (40,60) to move outward to provide sufficient clearance for the saw blade (24,62) at the maximum tilt orientation. A scale (80) is provided on the fixed (38,58) and adjustable (40,60) fence portion providing an indication of maximum inboard position for various tilt angles.

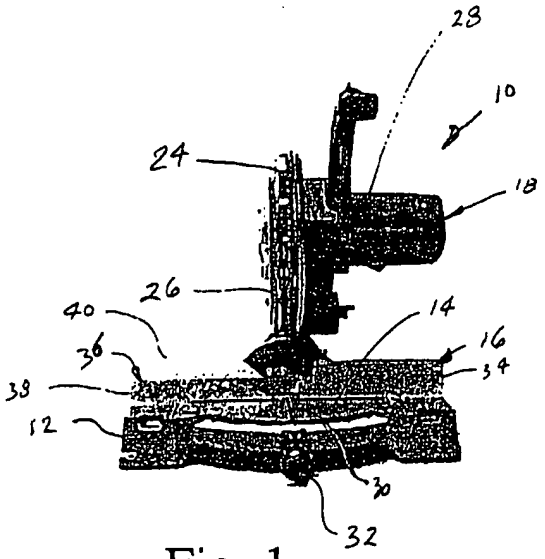

Fig. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to fences for miter saws and in particular, to compound miter saws.

2. Background Art

[0002] Compound miter saws both of the fixed pivot arm type and the sliding type are generally provided with a rotary table, a right and left fixed table sections which collectively define a horizontal planer table surface and a stationary fence which extends perpendicularly upward from the rear edge of the table surface. A workpiece to be cut is supported and/or clamped against the horizontal table and the fence to stabilize the workpiece during the cutting process. Miter saw fences are typically provided with an open center section aligned at the saw blade and right and left vertical support surface on opposite sides of the saw blade. In order to maintain the right and left fence portions in a common plane, fences are frequently made of unitary casting with the right and left fence portions interconnected by a low profile C-shaped section located sufficiently behind the back of the saw blade so as to avoid interference.

[0003] If the user wants to vary the miter angle, the rotary table and the rotary cutting blade are pivoted about a generally vertical axis. In order to make a compound miter cut, the saw blade and motor assembly is tilted about a horizontal axis which lies proximate the plane of the rotary table. Typically, the saw blade will be able to be adjusted from a vertical position to a 45° counter-clockwise when viewed from the front of the miter saw. In order to accommodate blade movement, the left fence portion needs to be cut away sufficiently so as to not interfere with the saw blade or the associated protective guard housing when the saw is being used at the maximum tilt angle. Unfortunately, when the saw is used with the blade perpendicular to the table, i.e. "0" tilt, the cutaway left fence provides less support than desirable, particularly when cutting short tall workpieces. To address this problem in the past, some users have installed temporary fence extensions, such as 12.7 (½") thick hardwood boards overlying the right and left fence members. These fence extensions can be taller and extend inwardly toward the saw blade as far as possible without interfering with the blade or guard move at the "0" tilt orientation. When it is needed to tilt the saw blade, the fence extension must be removed in order for the rotary blade and motor arm assembly to tilt.

[0004] In an effort to maximize the fence area and workpiece support, efforts have been made to have fences which are shiftable by the user. Shiftable fences must be set using a trial and error technique, typically by moving the fence inboard while holding the blade in the plunged position in order to maximize support while protecting interference. Simply setting the fence by eye can result in interference between the blade guard and the fence during a cut which invariably will result in less than perfect cut in the workpiece since the workpiece will have to be unclamped and the fence readjusted, the workpiece reclamped and the cutting process continued.

SUMMARY OF THE INVENTION

[0005] The present invention is intended to provide a slidable fence to enable the position of the fence to be varied inwardly in order to maximize the support at various tilt angles of the blade assembly. Accordingly, a compound miter saw is provided with a fence assembly having a right and left fence portion extending on opposite sides of the tiltable blade assembly. At least one of the fence assemblies is provided with an adjustable portion which may be moved transversely toward and away from the blade and fixable to the table at various positions which provide clearance between the blade and fence, yet maximize the support of the workpiece in the region immediate the saw blade. A scale is provided on the fixed and adjustable fence portion providing an indication of maximum inboard position for various tilt angles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006]

FIGURE 1 is a front perspective view of a miter saw incorporating a fence of the present invention at a "0" blade tilt orientation;

FIGURE 2 is a view of the miter saw of Figure 1 with the blade tilted at 45°;

FIGURE 3 is a front perspective view of an alternative miter saw embodiment;

FIGURE 4 is a left quarter perspective view of the miter saw of Figure 3;

FIGURE 5 is a front view of a sliding fence assembly utilized on the miter saw of Figure 3 with the fence position at the "0" tilt orientation;

FIGURE 6 is an enlarged partial view of the sliding fence of Figure 5 with the fence position at the 15° tilt orientation;

FIGURE 7 is an enlarged partial front view of the sliding fence of Figure 5 with the fence position at the 30° tilt orientation;

FIGURE 8 is a rear view of the sliding fence of Fig-

ure 5;

FIGURE 9 is an exploded perspective view of the rear side with a sliding fence; and

FIGURE 10 is a front view illustrating an alternative scale embodiment, but otherwise corresponding to the adjustable fence section shown in Figure 7.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0007] Figures 1 and 2 illustrate a first compound miter saw mounting 10 incorporating the present invention. Compound miter saw 10 is provided with a fixed base 12, rotary table 14 which is pivotable relative to the fixed base 12 about a vertical axis. Fixed base 12 and rotary table 14 collectively define a horizontal planer support surface illustrated. Attached to fixed base 12 and spanning across rotary table 14 is fence assembly 16 which provides a vertical planer support surface which is perpendicular to the horizontal table surface of fixed base 12 and rotary table 14. The horizontal table surface and the perpendicular support surface of the fence collectively support workpieces while they are being cut on the compound miter saw. The compound miter saw further includes a pivoting arm rotary saw assembly 18 which operates in a conventional fashion. The arm assembly is provided with a fixed end 20 pivotally connected to rotary table 14 and a distal end terminating in a handle 22. Intermediate the fixed distal ends of the arm rotary is saw assembly 18 which has a rotary saw blade 24 protected by a suitable guard 26 and driven by a conventional motor assembly 28.

[0008] In use, to make a conventional square cut in a workpiece, the saw as oriented in the position shown in Figure 1, is capable of being downwardly pivoting about fixed end 20 on the rotary saw blade 24 to pass through the workpiece supported on the horizontal table surface and continue on through slide 30 until the workpiece is completely severed in two. In order to form a miter cut, table lock 32 is released enabling the entire table saw blade and arm assembly to rotated relative to fence assembly 16. Alternatively, one can make a simple miter cut by tilting the saw blade as illustrated by the miter saw position shown in Figure 2, where the arm assembly and saw blades are rotated and locked at a selected angle about a generally horizontal axis aligned parallel to rotary table 14 and slot 30 formed therein. When making a compound miter cut, rotary table 14 in the oriented through slide 30 extends at an angle relative to fence 16 in addition to having the blade tilted as shown in Figure 2 relative to the table surface.

[0009] As a result, a tilting movement of the saw blade counter-clockwise to the left when viewed from the front as shown in Figure 2, the fence portion to the left of saw blade 24 must be appropriately cut away to provide clearance for the saw blade in surrounding guard 26. Conventional fence assemblies are cut away in order to provide clearance for the saw blade and surrounding guard at the maximum tilt angle throughout the entire range of table rotation. Accordingly, the left fence is frequently undersized and provides less support than desirable when cutting tall short length workpieces. To solve this problem, the present fence assembly 16 is made up of a first fixed fence portion 34 on the right hand side of the table surface and a second fence portion 36 on the left side of the table. The second fence portion includes a fixed section 38 mounted on the horizontal table surface of base 12 and an adjustable section 40 which slidably mounts on fixed section 38 for transverse movement toward and away from saw blade 24. In the illustration of Figure 1, adjustable fence 40 is moved toward the saw blade 24 and locked in a position which provides maximum support for a tall short length workpiece. When it is desired to tilt the saw blade to a 45° angle as shown in Figure 2, adjustable fence section 40 is shifted away from the saw blade and locked in position to provide adequate clearance for the saw blade and the surrounding guard assembly.

[0010] An alternative embodiment of the miter saw of the present invention is illustrated in Figures 3 and 4 with details of the adjustable fence assembly further illustrated in Figures 5-9. Compound miter saw 50 illustrated in Figures 3 and 4, function in a similar manner to miter saw 10 described with reference to Figures 1 and 2, the differences being primarily routine design choices. Compound miter saw 50 is similarly provided with an adjustable fence assembly 52 and a first fence portion 54 and a second fence portion 56 made up of a fixed section 58 and an adjustable section 60. The fixed and adjustable sections 58 and 60 of the second fence portion 54 collectively define a planer vertical fence surface to the left of rotary saw blade 62 which is generally co-planer with a corresponding planer support surface associated with first fence portion 54 to the right of saw blade 62.

[0011] An enlarged front view of the fence assembly removed from the miter saw is shown in Figure 5. Adjustable section 60 is preferably provided with a high handle region 64 at the supper edge of the adjustable section to be grasped by the user. Adjustable section 60 is slidably movable relative to fixed section 58. In the embodiment illustrated, this sliding connection is achieved by a tongue and groove connection. Tongue 66 is provided on adjustable section 60 and a groove 68 (best seen in Figure 9) is provided in fixed section 58. Ideally, the rear side of tongue 66 will be provided with a groove 70 into which the end of the bolt portion of locking knob 72 will extend. Locking knob 72 is provided with a threaded bolt section which threadily cooperates with bore 74 in second fence fixed section 58 as illustrated in Figure 9.

[0012] The operator can conveniently grasp the knob portion of block member 72 to loosen and re-tighten the lock knob to facilitate adjustment and re-locking of ad-

justable section 60 relative to fixed section 58 of the second fence portion 56. Of course, other sliding joints and other forms of locking mechanisms can be alternatively used such as through slots extending through one of the fixed or adjustable fence portions and a corresponding bolt or other forms of linear guide ways. Additionally, while only one locking knob 72 is illustrated, multiple locking knobs or additional screws or structure can be added to interconnect the fixed and adjustable sections of the second fence portion.

[0013] In order to maintain the second fence portion face square to the table, the adjustable and fixed sections of the second fence forming the planar fence face are machine surfaces. Ideally, at least a portion of the sliding contact between the fixed and adjustable fence will similarly be machined in order to maintain the fixed and adjustable fences in coplanar alignment. Preferably, as is conventionally known, the first fence portion and the second fence portion are maintained in proper alignment by integrally forming the fence portions from a common casting as illustrated in Figure 8. First fence portion 56 and the fixed section of second fence portion 56 are interconnected by a generally C-shaped bight section 76. Bight section 76 extends sufficiently rearward of the blade at maximum ends of cut when providing blade clearance, yet, has sufficient cross-section to provide rigidity to the fence assembly. The fence assembly is affixed to the base of the miter saw in a conventional manner using bolts which extend through apertures 78 and the fence assembly.

[0014] In order to make it easier for the operator to position the adjustable section 60 of the second fence, indicia is provided on the second fence fixed and adjustable portions as illustrated in Figures 5, 6 and 7. In the embodiment of the invention illustrated in Figures 3-9, second fence fixed section 58 is provided with a pointer 80 cast into the face surface as illustrated. Corresponding pointer markers 80, 84, 86 and 88 are formed in the adjustable section 60. Marker 82 is provided with "0" indicia indicating that marker 82 should be aligned with pointer 80 when the blade is oriented at the "0" tilt angle. As blade tilt increases, adjustable section of the second fence 60 must be moved to the left and accordingly, additional markers 85, 86 and 88 having 15°, 30°, and 45° indicia are provided to assist the operator at locating the adjustable section of the second fence at various blade tilt angles.

[0015] Alternatively, as illustrated in Figure 10, a pointer 90 may be located on the adjustable section of the second fence and the corresponding indicia markers located on the fixed section. The preferred embodiment of the invention illustrated is only a representative example of how the present invention can be implemented in a compound miter saw. Alternatively, the present fence invention could be used on a sliding compound miter saw or it could be adapted to be used on both the right and left fence portions of miter saws which are capable of tilting in both directions.

Claims

1. A fence assembly (16,52) for a compound miter saw (10,50) comprising:

   a first fence portion (34,54) affixable to a compound miter saw (10,50) on a first side of a tiltable saw blade (24,62) and having a first face extending upwardly and generally perpendicular to a horizontal table surface;
   a second fence portion (36,56) affixable to a compound miter saw (10,50) on a second side of the saw blade and having a second face extending upwardly and generally perpendicular to a horizontal table surface wherein the second fence portion (36) is made up of a fixed section (38,58) mounted to the horizontal table surface and an adjustable section (40,60)) which slidably mounts on the fixed section (38) for transverse movement toward and away from the saw blade (24); and a scale having a pointer (80) formed on one of the fixed and adjustable fence sections (58,60) of the second fence portion (36,56) and a series of indicia on the other of the fixed and adjustable sections (58,60) of the second fence portion (36,56) providing a visual indication to the user of the proper orientation of the adjustable fence corresponding to the saw blade (24,82) tilt angle;

   wherein when the saw blade (24,62) is tilted adjustably away from vertical toward the second fence portion (36,56), the second fence portion adjustable section (60) can be moved outward to provide clearance for the saw blade (24,62) and when the saw blade (24,62) is returned to the vertical orientation, the adjustable fence section (60) can be moved toward the saw blade (24,62) to provide additional support for a workpiece to be supported relative thereto while it is being cut by the saw blade (24).

2. The fence assembly (16,52) as claimed in claim 1 where the first fence portion (56) and the fixed sections (58) of the second fence portion (36,56) are integrally formed and interconnected by a bight section (70).

3. The fence assembly (16,52) as claimed in claim 1 or claim 2 further comprising a locking mechanism (66,68,72) for retaining the adjustable section (60) and fixed section (58) of the second fence portion (56).

4. The fence assembly (16,52) as claimed in any one of the preceding claims wherein the fixed and adjustable sections (58,60) of the second fence portion (56) are interconnected by a tongue (68) and groove (68) joint.

5. The fence assembly (16,52) as claimed in any one of the preceding claims wherein the groove (68) is formed on the fixed section (58) and the tongue (66) is formed on the adjustable section (60) of the second fence portion (56).

6. The fence assembly (16,52) further comprising a lock member for interconnecting the adjustable and fixed sections of the second fence portion (56).

7. A miter saw (10,50) comprising:

a base (12) and a generally planar horizontal table surface (14);
an arm assembly having a fixed end pivotally connected to the base (12), a distal end forming a handle (22) and an intermediate section therebetween supporting a rotary saw blade (24) which moves toward and away from the table surface (14) to cut a workpiece positioned thereon as the arm assembly is pivoted about the fixed end, the arm assembly being further tiltably adjustable relative to the base (12) enabling the blade (24) to be tilted from perpendicular relative to the table surface to form an angled cut;
a fence assembly as claimed in any one of the preceding claims affixed to the horizontal table surface (14) of the base (12) defining a planar fence surface supporting a workpiece which extends upwardly perpendicular to the horizontal table surface;
the fence assembly first portion (34) being on a first side of the saw blade (24) and the second portion (36) being on an opposite side of the saw blade (24) toward which the saw blade (24) moves when it is tilted away from vertical.

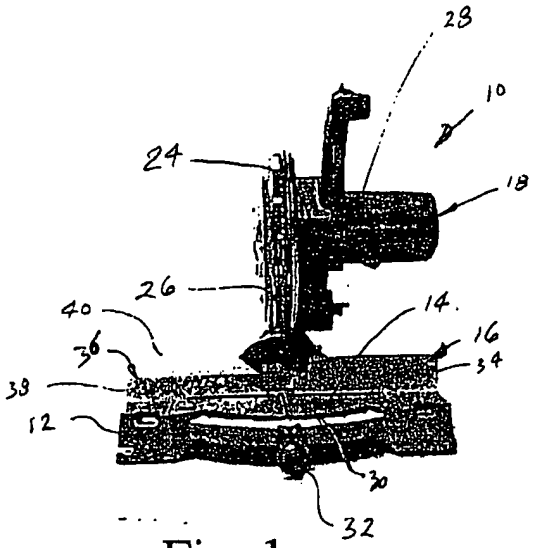


Fig. 1

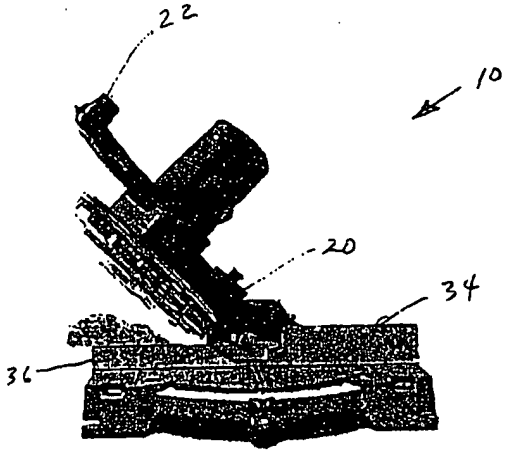


Fig. 2

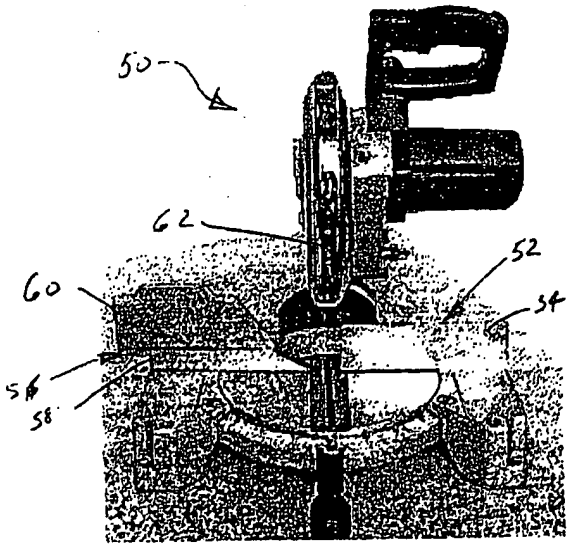


Fig. 3

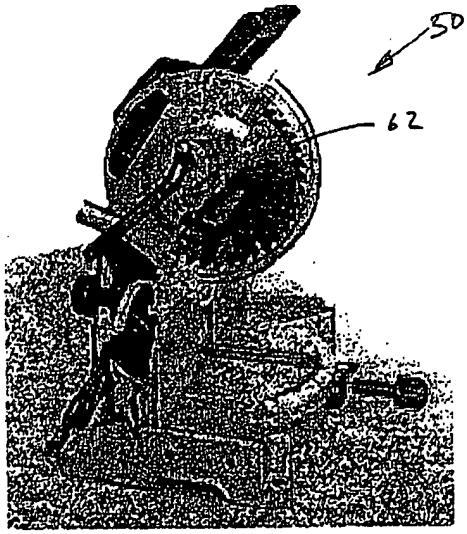


Fig. 4

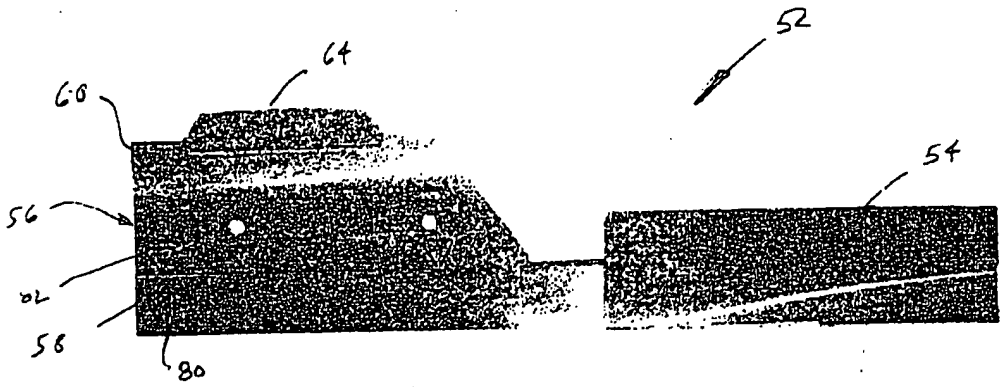


Fig. 5

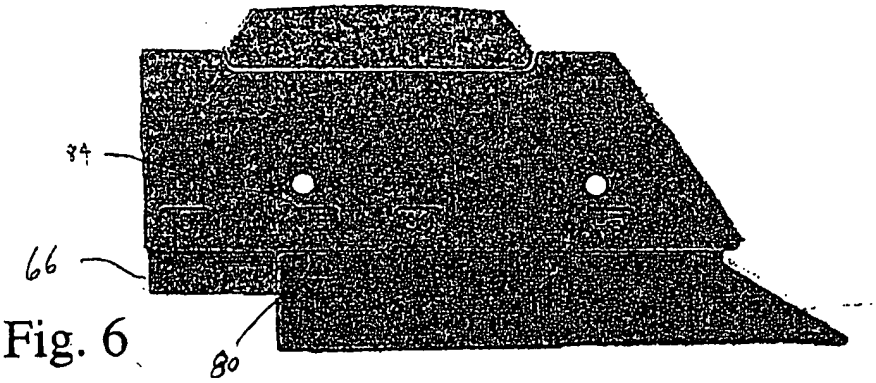


Fig. 6

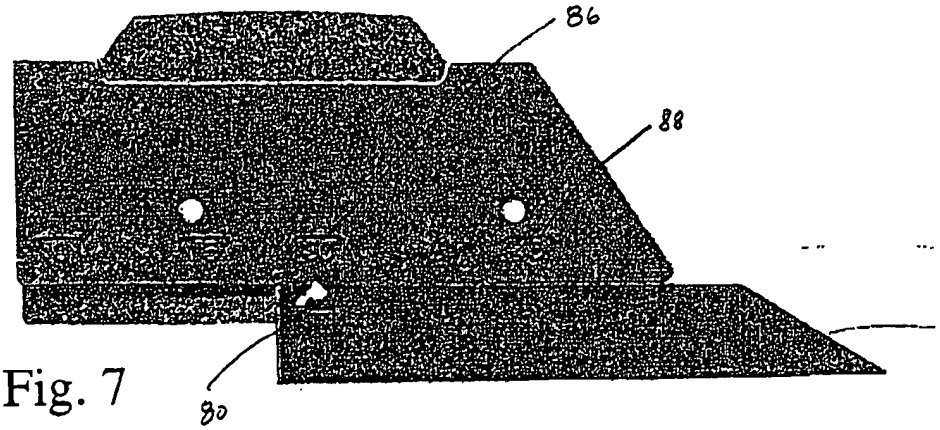
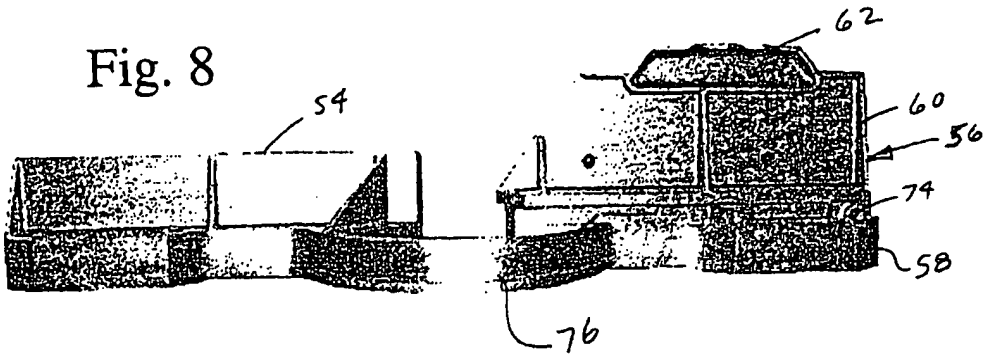


Fig. 7

Fig. 8



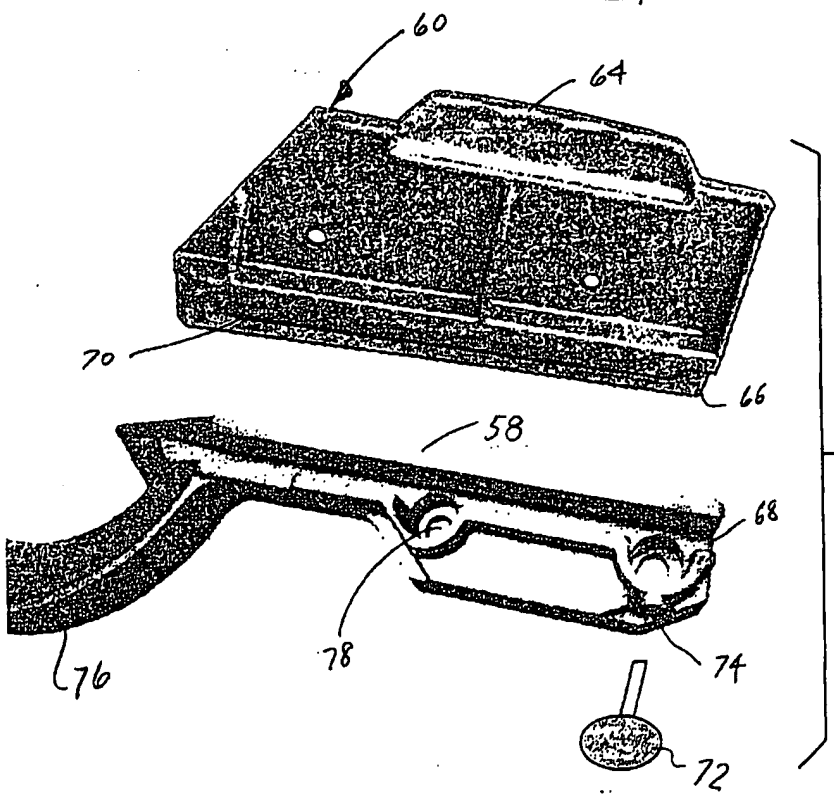


Fig. 9

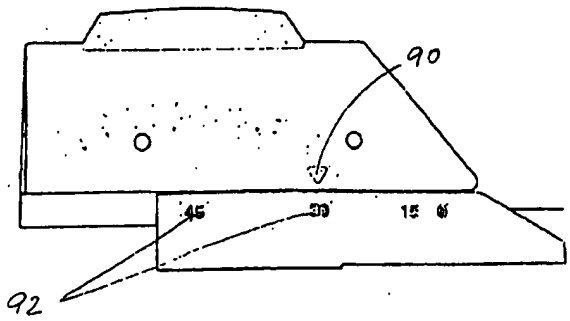


Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 0279

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 752 300 A (BLACK & DECKER INC) 8 January 1997 (1997-01-08) * the whole document *	1-7	B27B27/08
A	US 5 297 463 A (O'BANION MICHAEL L ET AL) 29 March 1994 (1994-03-29) * the whole document *	1	
A	US 5 752 422 A (INOUE NOBUHIRO ET AL) 19 May 1998 (1998-05-19) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B27B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 April 2002	Rijks, M

CATEGORY OF CITED DOCUMENTS

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29-04-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0752300 A	08-01-1997	US 5755148 A	26-05-1998
		CN 1145833 A ,B	26-03-1997
		DE 69619028 D1	21-03-2002
		EP 0997243 A1	03-05-2000
		EP 0997244 A1	03-05-2000
		EP 0752300 A1	08-01-1997
		TW 403696 B	01-09-2000
		US 5943931 A	31-08-1999
		US 5957022 A	28-09-1999
US 5297463 A	29-03-1994	NONE	
US 5752422 A	19-05-1998	JP 9103913 A	22-04-1997

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